

AIRS Version 6 at the GES DISC: Processing, New Related Products, and Giovanni

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Outline

- Version 6 Processing Status
- New Related Products
 - Sounder PEATE
 - Level 3 Lite
 - Climatology
- Giovanni-4

Version 6 Processing Status

- Processing is Complete for AIRS+AMSU and AIRS-Only
- We will go back to check for any missing granules
- Minor reprocessing of L2 and L3 following June 2013 look-up table update
- Version 6 AIRS+AMSU+HSB will proceed when the algorithm is ready
- Version 6 CO₂

Sounder PEATE Data

- Simultaneous Nadir Observation (SNO) Data are available. These Monthly near nadir match-ups between AIRS, IASI, CrIS, AMSU, ATMS, and MHS are available by ftp and will soon be searchable in Mirador.
 - ftp://airsl2.gesdisc.eosdis.nasa.gov/ftp/data/s4pa/Sounder_PEATE
 - Infrared Sub-directories: SPSNI[01-05]M
 - Microwave Sub-directories: SPSNM[01-14]M
 - More details are in the README file located in the “doc” sub-directories.
- Calibration Subsets and Level 3 will be added in the coming months

V6 Level 3 files are much larger

Level 3 Statistical variables	
Mean	V5 and V6
Counts	V5 and V6
Standard Deviation	V5 and V6
Error Estimates	V5 (some variables) V6 (most variables)
Minimum	V6
Maximum	V6
Grids	
Ascending/Descending	V5 and V6
Ascending/Descending_mw_only	V5 and V6
Ascending/Descending_TqJoint	V6

V5 files have 268 variables

V6 files have 785 variables

V6 Level 3 files are much larger

File	Number of Variables	Size (Megabytes)
Version 5 RetStd001 2002.09.06	268	76
Version 6 RetStd001 2002.09.06	785	400

The larger Version 6 files take longer to download, read, and manipulate with analysis tools.

A Level 3 lite product might be easier to use.

V6 Level 3 Lite Product

File	Number of Variables	Size (Megabytes)
Version 5 RetStd001 2002.09.06	268	76
Version 6 RetStd001 2002.09.06	785	400
Version 6 “Lite” ascending and descending only	375	183
Version 6 “Lite” ascending, descending, mean, counts, and standard deviation only	213	94

The lite files are smaller but we may want to trim some more.

Other Subsetting Options

- OPeNDAP
- Simple Subset Wizard (SSW)

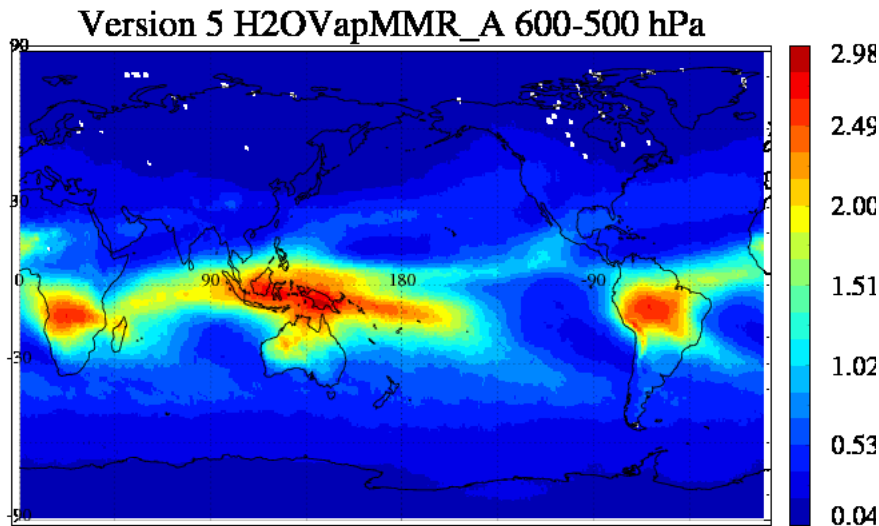
- ➔ Both are good for smaller sets of variables
- ➔ Do not work for large subsets
- ➔ Output is not in original format HDF-EOS

Climatology Product

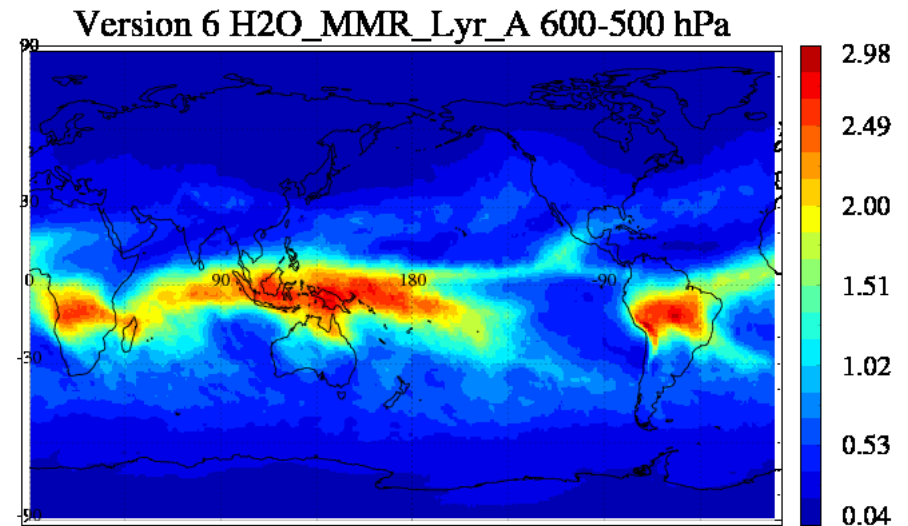
- Used in Giovanni for calculating anomalies
- Version 5 climatology in Giovanni was created offline using IDL
- Level 3 code can be run in “Climatology Mode” (e.g., daily, 8 day, monthly, **climatology**)
 - Consistent with Level 3
 - Can be used outside of Giovanni
 - 12 Files, 4.8 Gig

Climatology Product

Version 5



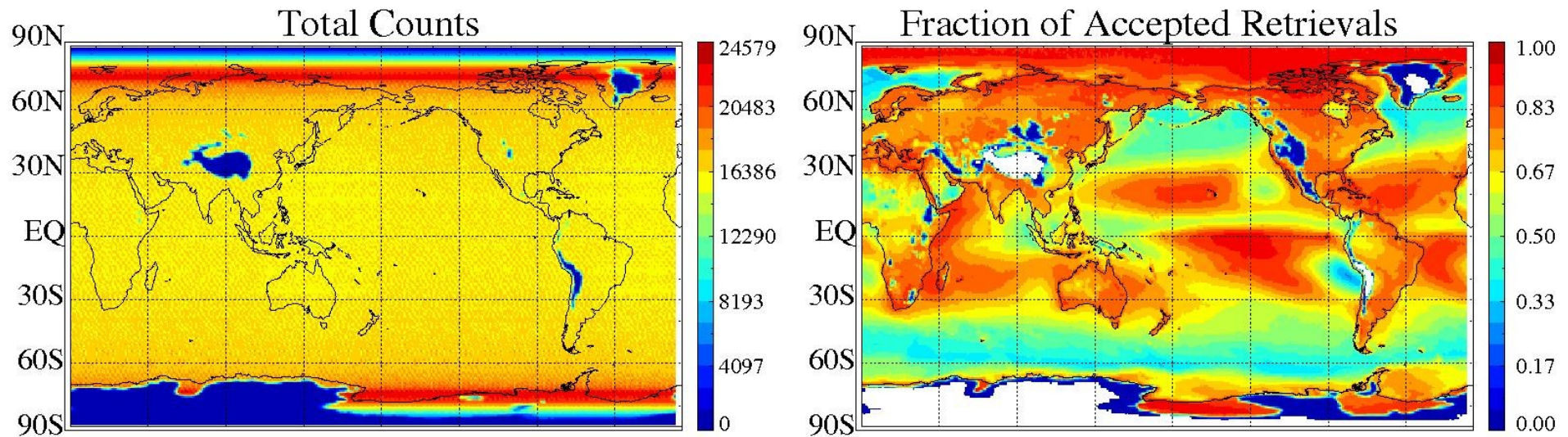
Version 6



Water Vapor Climatology for January in the 600-500 hPa Layer. V5 is for 2002-2011 and V6 is for 2 years.

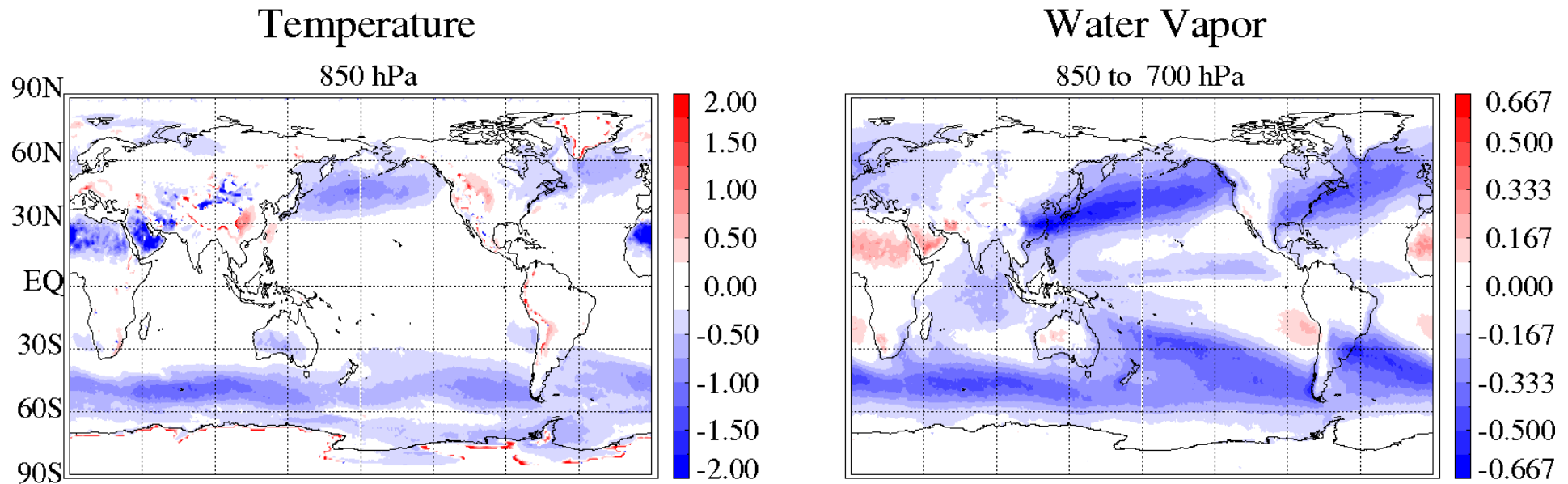
- Empty grid points over lakes have been filled in by the increase in yield and the new gridding methodology.
- The Version 6 Climatology appears to be more jagged. Because it is

Climatology Sampling



The sampling bias can be separated into two components that we call **temporal** and **instrumental** sampling biases (Hearty et al. 2014). The remaining differences are **combined measurement uncertainties**. The figure shows the Version 5 sampling for Temperature at 850 hPa.

V5 Instrumental Sampling Biases



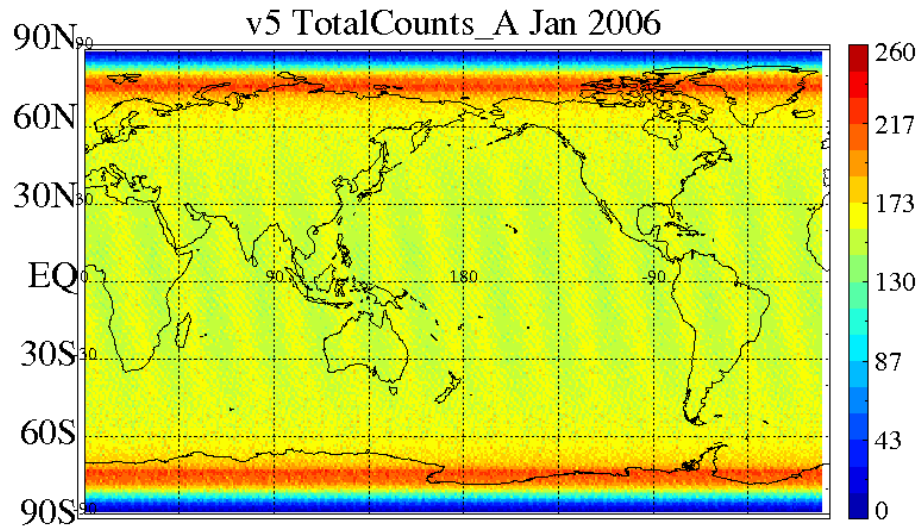
Using MERRA we showed that instrumental sampling biases can be up to ~ 1 K for temperature and $\sim 20\%$ for water vapor. The instrumental sampling biases are generally larger than the temporal sampling biases. Hearty et al. 2014, "Estimating sampling biases and measurement uncertainties of AIRS/AMSU-A temperature and water vapor observations using MERRA reanalysis," DOI:10.1002/2013JD021205)

Version 6 Sampling

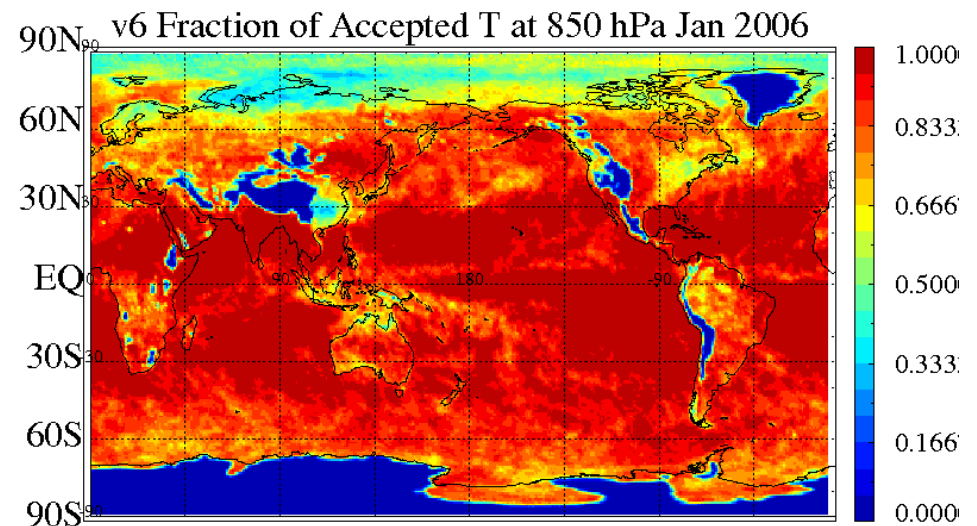
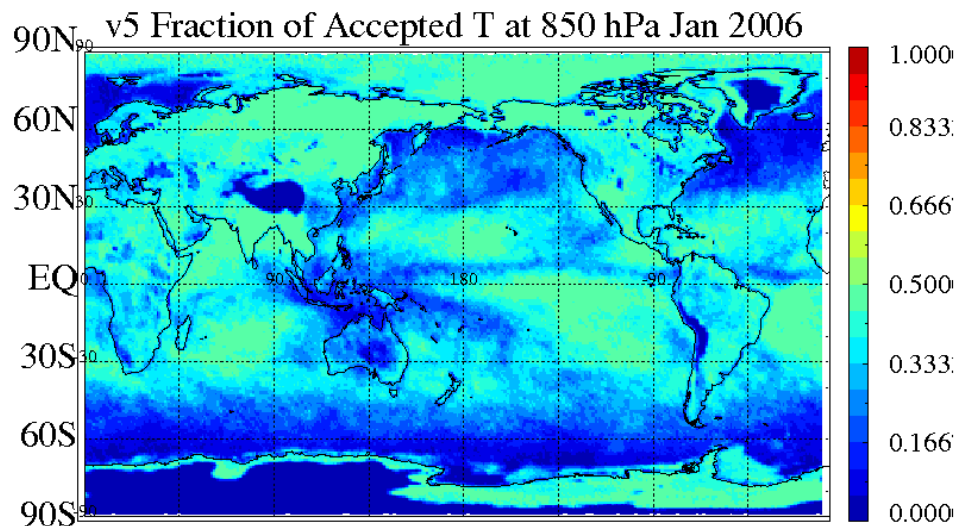
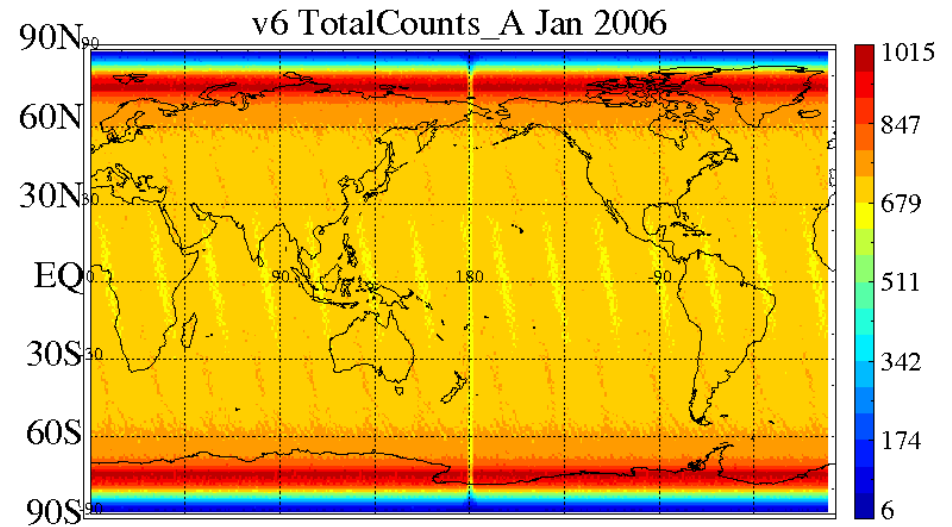
- Work is in progress
- The following slides show estimates for January 2006

Version 6 has improved sampling

Version 5



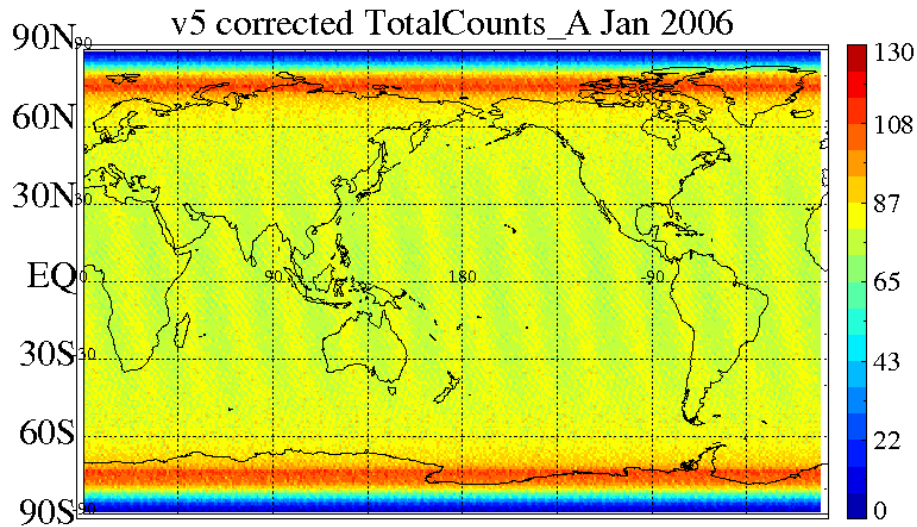
Version 6



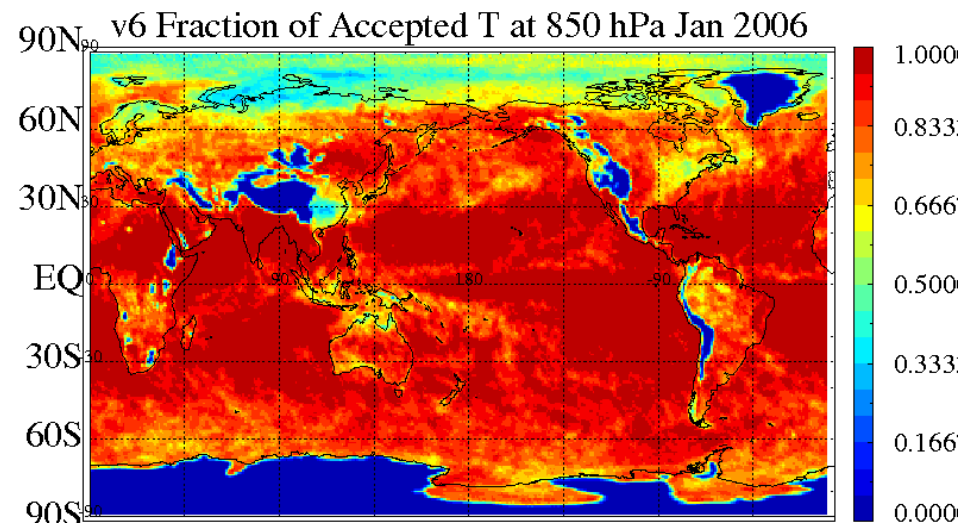
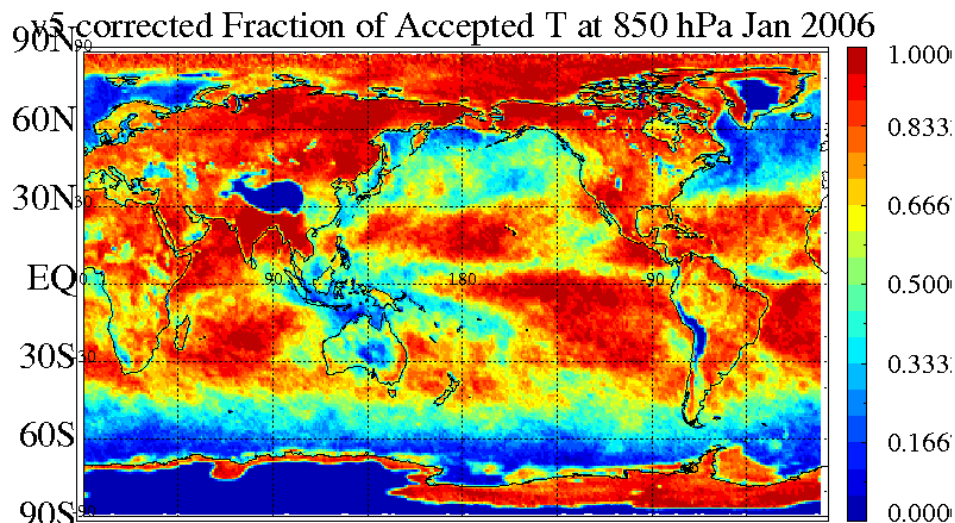
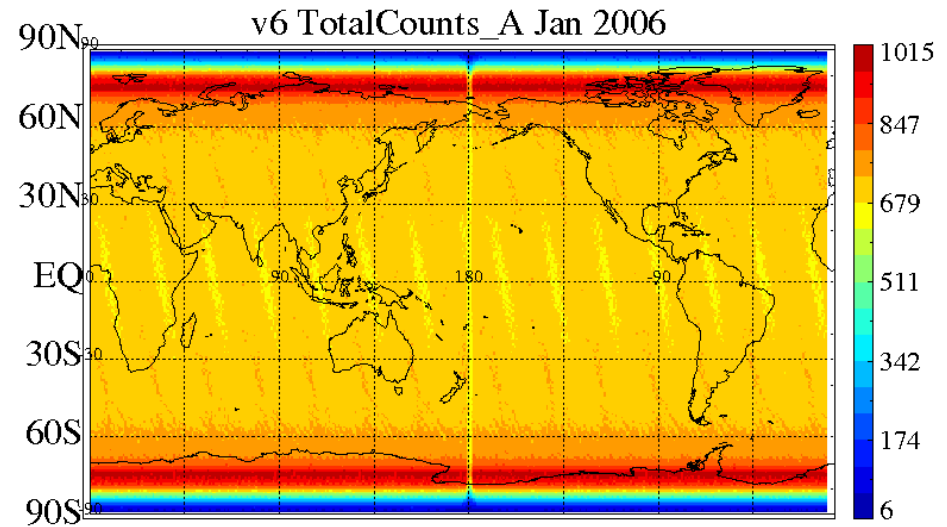
Bug in V5 totalcounts

Version 6 has improved sampling

Version 5



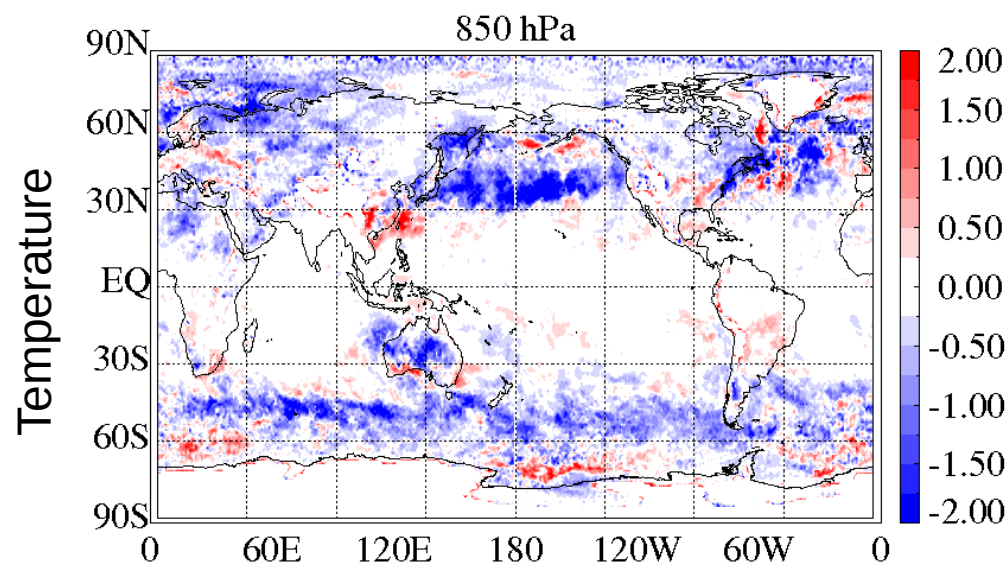
Version 6



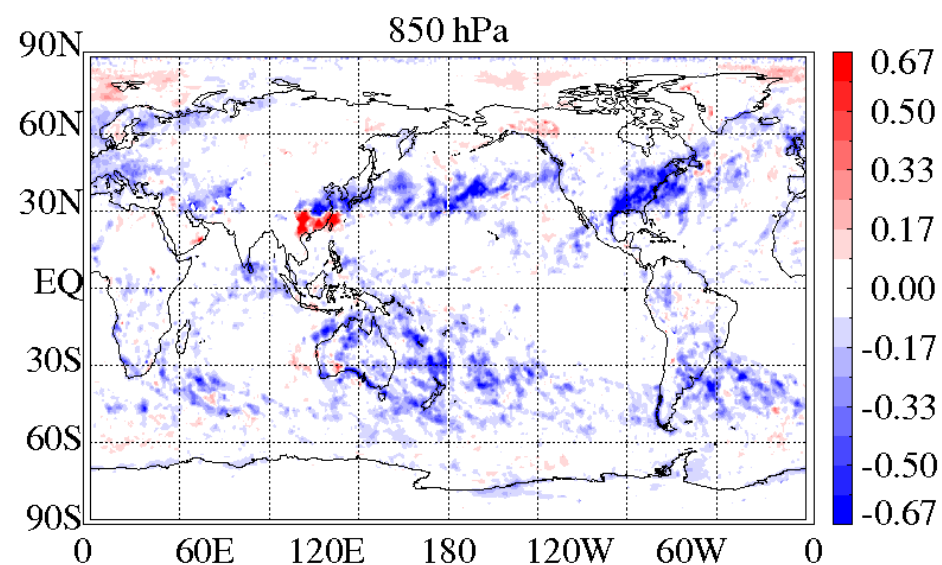
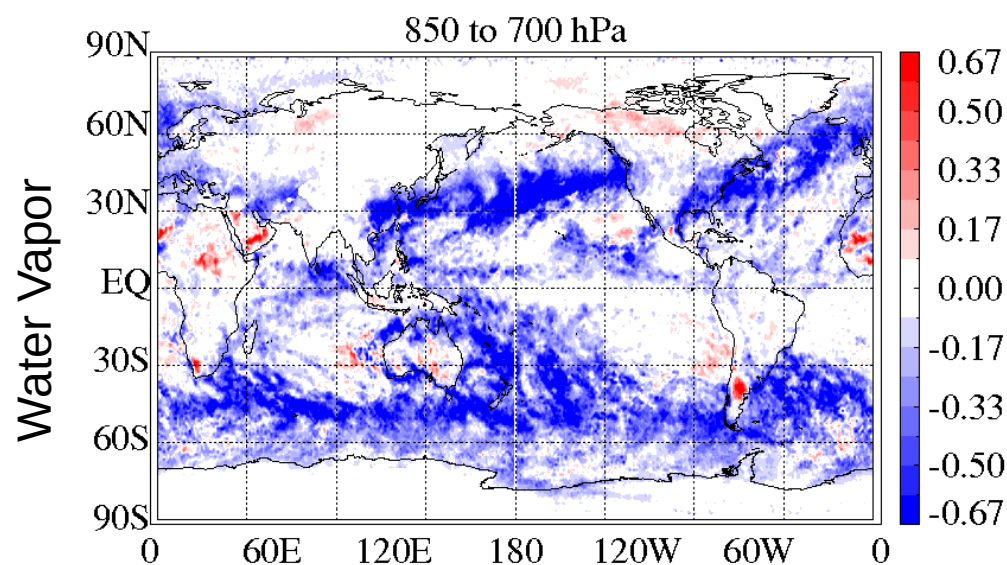
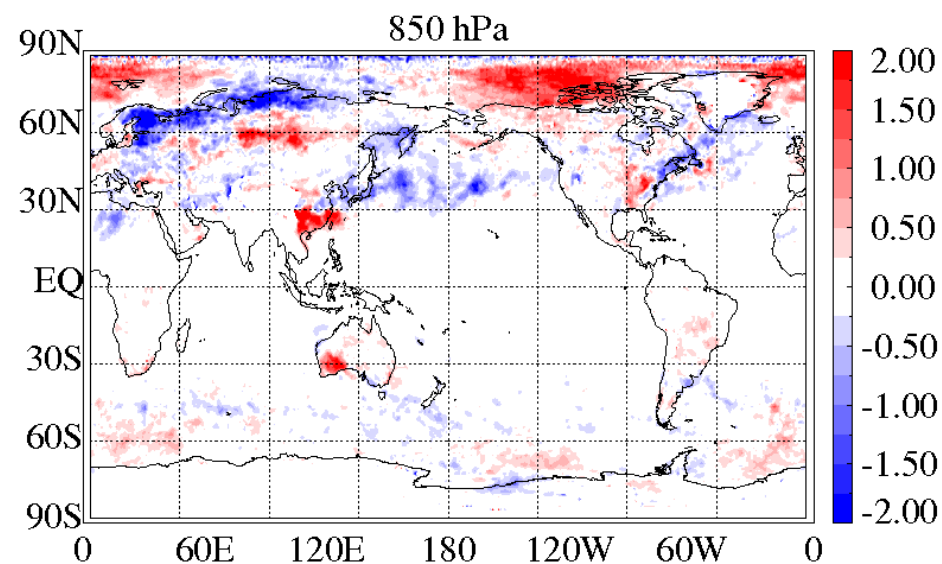
Version 5 had bug that allowed some temperatures below the surface.
Version 6 has an artifact along the dateline.

Version 6 Sampling Bias Estimates

Version 5



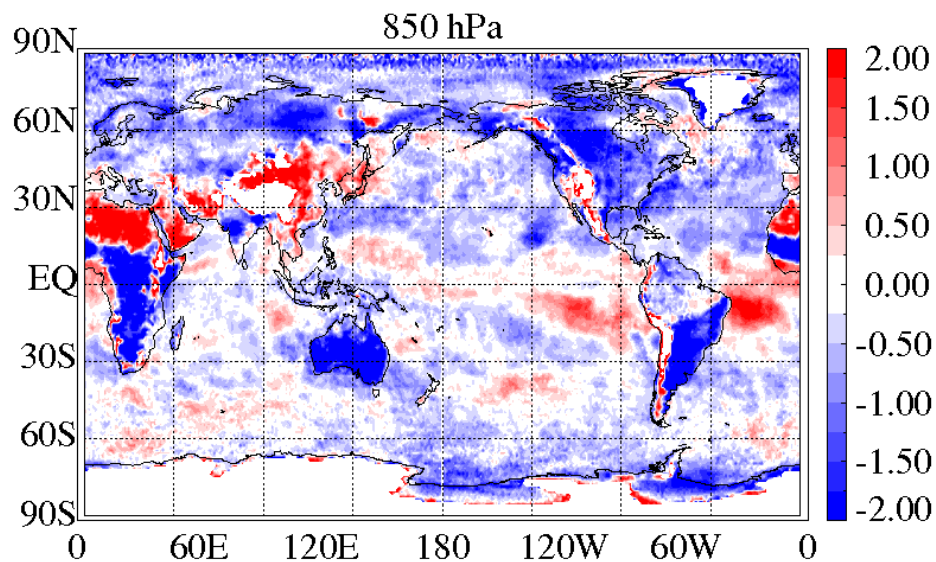
Version 6



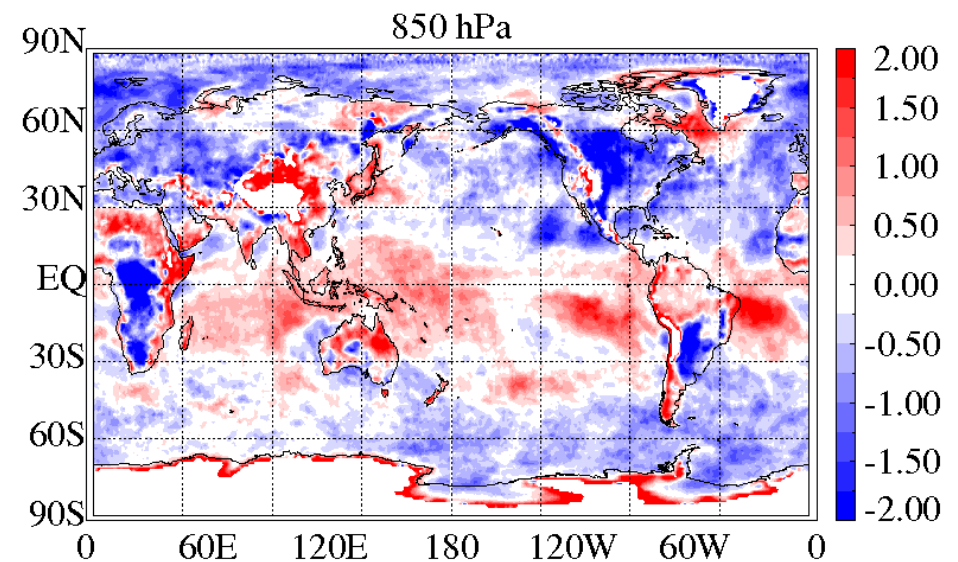
Caveat: Assuming MERRA has information where AIRS does not

Version 6 Measurement Errors

Version 5



Version 6



I only show temperature because Version 5 combined water vapor Error estimates are for layers while Version 6 are for levels.

Giovanni-4

- Release of Giovanni-4 was roughly contemporaneous with AIRS Version6
- Version 5 is still available in Giovanni-3,
- Version 6 data is available in Giovanni-4

Giovanni-4 Changes

- Faster than Giovanni-3
- New Interface
- Ability to perform comparisons of different platforms
- Interactive Plots
- Seasonal options
- Does not have every variable. Users need to use the Feedback button to request variables or services that are not there.

Old Giovanni-3 Interface


FileEditViewHistoryBookmarksToolsHelp

Giovanni - Interactive Visual...Giovanni - AIRS Online Visua...Giovanni - AIRS Online Visua...+

gdata1.sci.gsfc.nasa.gov/daac-bin/G3/gui.cgi?instance_id=AIRS_Level3Daily

Google

GmailGoogle MapsMerriam-Webster O...WP WeatherThe DISC Web Page...The Loh LifeAIRS: DOCUMENTA...Metro - HomepageNASA Goddard's Sci...



Area of Interest: West: -180North: 90South: -90East: 180Update Map

Select Levels for '(3D)' Parameters

- For 'vertical' (pressure) plots using '(3D)' parameters, select a Lower/Upper Level range.
- For 'horizontal' (lat-lon) plots, select only one Level (i.e., Upper Level = Lower Level).

Upper Level

Lower Level

NOTE: Humidity profiles, H2O* and relative humidity* (3D), are **LAYER** variables; they represent the mean value of the corresponding entity in the layer enclosed within indicated levels; e.g. a humidity entity selected at 500 mb represents the mean quantity in the layer 500-400 mb.

Parameters

Display: ☒ Data Product Info ☐ Units ☐ Parameters with > 2 Dimensions

☐ AIRX3STD.005(2002/08/31 - 2013/02/28)

Parameter	Data Product Info
<input type="checkbox"/> CH4 degree of freedom_descending (CH4_dof_D)	Aqua - AIRS standard
<input type="checkbox"/> CH4 degree of freedom_ascending (CH4_dof_A)	Aqua - AIRS standard
<input type="checkbox"/> CH4 volume mixing ratio_ascending (CH4_VMR_eff_A) (3D)	Aqua - AIRS standard
<input type="checkbox"/> CH4 volume mixing ratio_descending (CH4_VMR_eff_D) (3D)	Aqua - AIRS standard
<input type="checkbox"/> CO degree of freedom_ascending (CO_dof_A)	Aqua - AIRS standard

Temporal

Begin Date

Year2013MonthFebDay28(Date Begin: 31 Aug 2002)

End Date

Year2013MonthFebDay28(Date End: 28 Feb 2013)

Select Visualization:

Lat-Lon map, Time-averaged

Edit PreferencesVisualization Help

Generate VisualizationReset

New Giovanni-4 Interface

File Edit View History Bookmarks Tools Help

Giovanni

giovanni.gsfc.nasa.gov/giovanni/#service=CORRELATION_MAP&starttime=&endtime=&bbox=-180,-90,180,90&variableFace

Google

Gmail Google Maps Merriam-Webster O... WP Weather The DISC Web Page... The Loh Life AIRS: DOCUMENTA... Metro - Homepage NASA Goddard's Sci...

NASA Earth Data Data Discovery Data Centers Community Science Disciplines Search EOSDIS

Giovanni

The Bridge Between Data and Science v 4.6 [Release Notes](#) [Browser Compatibility](#) [Known Issues](#)

Version 003 of SeaWiFS Deep Blue Level 3 variables are no longer available... [\[1 of 2 messages\]](#) [Read More](#)

Select Plot

- ☐ Map
- ☐ Map Animation
- ☒ Correlation Map
- ☐ Scatter Plot
- ☐ Interactive Scatter Plot
- ☐ Time-Averaged Scatter Plot
- ☐ Time Series
- ☐ Vertical Profile

Select Date Range (UTC)

YYYY-MM-DD

-

-

00hrs

to

-

-

23hrs

Valid Range: 1979-01-01 to 2014-03-11

Please specify a start date.

Select Region (Bounding Box)

Format: West, South, East, North

-180, -90, 180, 90

Select Variables

▼ Disciplines

- ☐ Atmospheric Dynamics (6)
- ☐ Water and Energy Cycle (10)

▼ Measurements

- ☐ Air Temperature (2)
- ☐ Atmospheric Moisture (4)
- ☐ Latent Heat Flux (1)
- ☐ Sensible Heat Flux (1)
- ☐ Wind Stress Direction (1)
- ☐ Wind Stress Magnitude (1)

▼ Platform / Instrument

- ☒ AIRS (6)
- ☐ GOCART Model (9)
- ☐ MISR (1)
- ☐ MODIS-Aqua (5)

Number of matching Variables: 10 of 37

Please select 2 variables

Keyword:

	Variable Name	Temp. Res.	Spat. Res.	Begin Date	End Date	Vert. Slice
<input type="checkbox"/>	Wind Stress Magnitude, GSSTF, Monthly Grid, 0.25 x 0.25 deg. (GSSTFM v3)	1M	0.25 x 0.25 °	1987-07-01	2008-12-31	-
<input type="checkbox"/>	Wind Stress Vector, GSSTF, Monthly Grid, 0.25 x 0.25 deg. (GSSTFM v3)	1M	0.25 x 0.25 °	1987-07-01	2008-12-31	-
<input type="checkbox"/>	Atmospheric Temperature (3D), daytime (ascending), AIRS, 1 x 1 deg. (AIRX3STD v006)	1D	1 x 1 °	2002-08-31	2014-03-10	1000 hPa
<input type="checkbox"/>	Atmospheric Temperature (3D), nighttime (descending), AIRS, 1 x 1 deg. (AIRX3STD v006)	1D	1 x 1 °	2002-08-31	2014-03-10	1000 hPa

Responsible NASA Official: Steven.J.Kempner@nasa.gov
Web Curator: M. Hegde@gssc-giovanni-disc@lists.nasa.gov
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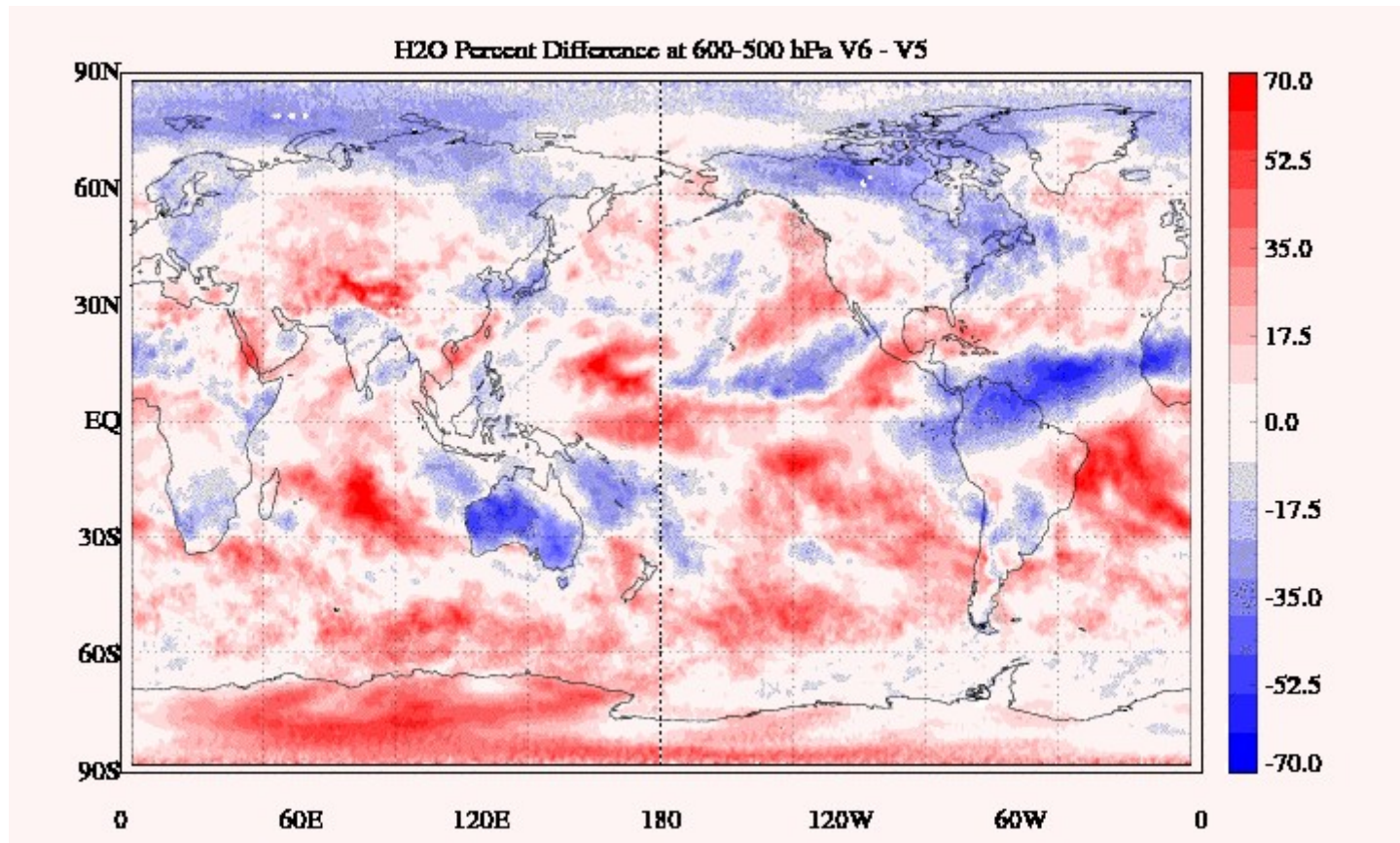
Variables in Giovanni

- Use the Feedback Button to request additional variables or features
- AIRS Level 3 Daily
 - Temperature
 - Water vapor
 - Relative humidity

Summary

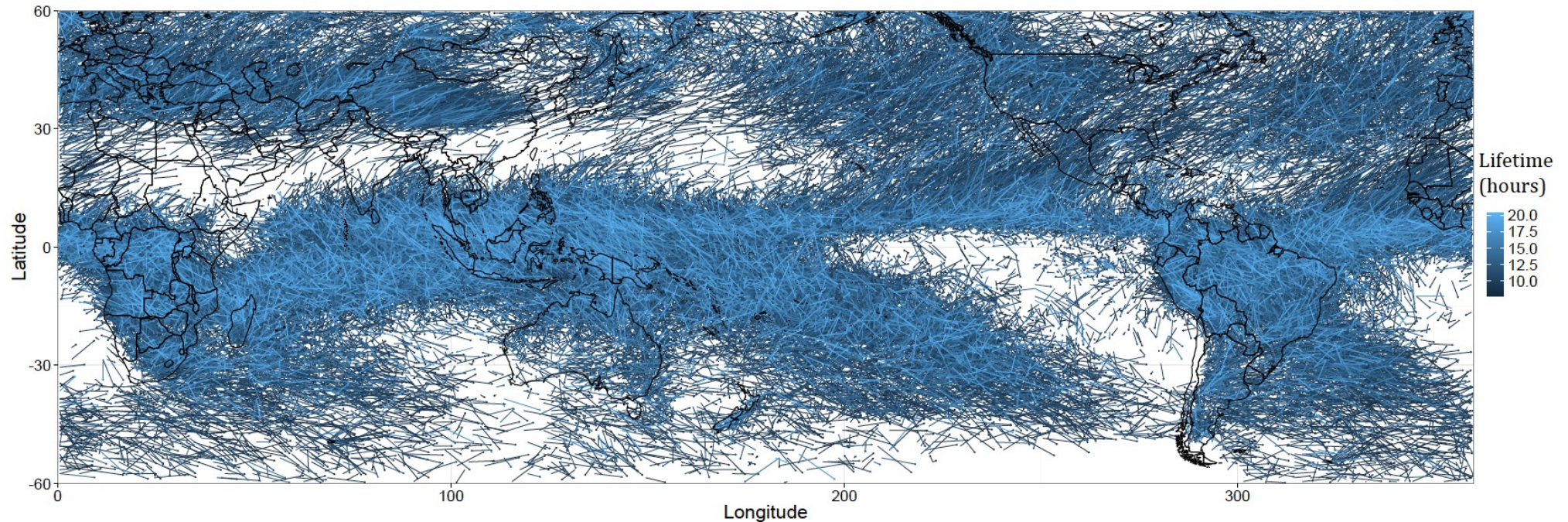
- Reprocessing is mostly complete
- New Products
 - Sounder PEATE- Available
 - Level 3 Lite- planned
 - Level 3 Climatology- planned
- AIRS Version 6 data is in Giovanni-4

Climatology



Differences can be due either to differences in sampling or differences in the Measurements.

Storm Tracks



Esmaili, R., Y. Tian, D. Vila, 2014: Global Tracking and Life Cycle Analysis of Distinct Storm Species using a Decade of Satellite Observations. American Meteorological Society, Atlanta, GA, Feb. 2-6, 2014. (2001-2012)